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How Has Environment Mattered?

An Analysis of World Bank Resource Allocation*

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Executive Summary

How has environment mattered for the World Bank? The aggregate figures suggest that it has mattered a great deal, since the Bank's total environmental lending has exceeded $US 9 billion over the past six years. In this paper, we use newly-available data to address a more precise version of the question: Across countries and themes, how well have the Bank's environmental lending and Analytical and Advisory Activities (AAA) matched the incidence of environmental problems? For our assessment, we extend our previous work on local pollution and fragile lands (Buys, et. al., 2003) to consideration of global emissions, biodiversity, water resources and institutional development. We construct cross-country problem indicators for each environmental theme, and combine them with country risk measures to estimate optimal thematic lending and AAA for each country. Then we compare our estimates with actual lending and AAA to assess the match between environmental problems and the Bank's response.

We begin by constructing an overall indicator of environmental problems from our thematic indicators. Using regression analysis, we find a strong relationship between countries' general indicator values and the scale of their environmental borrowing, but a relatively weak relationship for AAA. At the thematic level, we find that problem indicators have relatively weak relationships with both lending and AAA. Adding country risk to the analysis, we test an optimal allocation model and find that it is consistent with the Bank's actual lending and AAA since 1998. We conclude that our model's assignment of lending and AAA to countries reflects the Bank's actual experience with partner countries. The model's explanatory power is relatively low, however, and when we compare model assignments to actual allocations, we find many large discrepancies for countries and environmental themes. Some gaps may reflect activity by other donor institutions, but many others may represent problems with efficient implementation of the Bank's Environment Strategy. To promote further discussion of this issue, we use our optimal allocation model to develop measures of lending opportunity by environmental theme for the Bank's partner countries.

1. Introduction

The World Bank has become the world's largest source of financing for environmental improvement in developing countries. During the period 1998 - 2003, the Bank lent approximately $US 9.2 billion for environmental purposes in 381 projects.[1] The scale of this activity indicates that environment has mattered a great deal to the Bank and its partner countries. Until recently, however, data scarcity has prevented a more detailed assessment of the Bank's environmental operations. In this paper, we use newly-available information to ask how, more precisely, environment has mattered: Across countries and themes, how well has the Bank's allocation of resources for lending and Analytical and Advisory Activities (AAA) matched the incidence of environmental problems? The analysis extends our previous work on local pollution and fragile lands (Buys, et al., 2003) to consideration of global emissions, biodiversity, water resources and institutional development. We construct a cross-country problem indicator for each environmental theme, and assess the match between thematic resource allocation and problem incidence. To assist in promoting a closer match, we also combine our environmental indicators with information on country risk to estimate optimal resource allocation across countries.

The remainder of the paper is organized as follows. Section 2 introduces our environmental indicators, and Section 3 provides a measure of country risk. Section 4 describes the Bank's environmental accounting information. In Section 5, we assess the match between country lending and the general scale of countries' environmental problems. Section 6 extends the analysis to thematic lending. Section 7 introduces our

[1] This estimate by the Bank's Environment Department includes environmental components of loans in other sectors (e.g., transport, agriculture), as well as loans that are attributed to the environment sector.

optimal allocation model, with a brief review of the methodology developed in Buys, et al. (2003). Assuming continuity with the past scale and thematic composition of lending, Section 8 uses the model to estimate lending and AAA opportunities by country and environmental theme for the period 2004-2009.[2] Section 9 interprets our findings using two country cases, and Section 10 provides a summary and conclusions.

2. Environmental Indicators

Building on prior work by Buys, et al. (2003), we construct country indicators for six environmental problems: greenhouse gas emissions; health damage from air and water pollution; the threat of natural resource degradation on fragile lands; threats to biodiversity; problems related to water resources; and problems with environmental policies and institutions. All of our indices reflect recent research on the cross-country incidence of environmental problems.

For global greenhouse gas emissions, our indicator is total metric tons of carbon-equivalent in 2000 from fuel combustion (CO2), land-use change (CO2) and other sources (methane (CH4), nitrous oxide (N20), hydrofluorocarbons (HFC's), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6)). We draw our emissions estimates from the World Resources Institute's Climate Analysis and Indicators database.[3] Our estimate of pollution damage is total DALY (disability-adjusted life year) losses from air and water pollution. We draw our DALY estimates from recent research

[2] The supporting database and an accompanying atlas can be downloaded from the Environment Department (lnweb18.worldbank.org/ESSD/envext.nsf/41ByDocName/Environment), or from the Development Research Group (www.worldbank.org/nipr).

[3] The World Resources Institute's Climate Analysis and Indicators database is available online at http://cait.wri.org.

by the World Bank, in collaboration with WHO (Pandey, et al., 2004; Wang, et al., 2003).

For natural resource degradation, we base our indicator on recent research that identifies the vulnerability of people on fragile lands (i.e., land that is steeply-sloped, arid, or covered by natural forest) as a major determinant of rural poverty and natural resource degradation in developing countries (World Bank, 2003). Our indicator, the total rural population living on fragile lands, has been constructed from a GIS (Geographic Information System) - based spatial overlay of demographic, topographical, climatic and natural resource information.

We have developed our biodiversity threat indicator from a variety of sources. For terrestrial biodiversity, we use a GIS-based spatial overlay of human population with critical areas identified by Conservation International (CI), the World Wildlife Fund (WWF), and Birdlife International (BI). We also include freshwater lake areas, to capture the role of inland aquatic ecosystems. The World Bank's Environment Strategy focuses on both the threat to biodiversity from human encroachment, and the value of biodiversity resources for human populations. Our indicator for this two-way relationship in each country is its total human population in critical biodiversity areas. For marine biodiversity, we draw on estimates of reef ecosystems at risk by Bryant, et al. (1998). Summing across all endangered reefs, we use each country's share of the total as our index of marine biodiversity threat. While terrestrial and marine threats are quite distinct geographically, we create a composite indicator to match the Bank's thematic category (biodiversity conservation). Since the two indices are weakly correlated (ρ = .27), assignment of relative weights has a significant impact on the result. We assign equal weights, because we have no scientific basis for a differentiated weighting scheme.

To construct a water-resource indicator, we draw on two sources of information. The first is an estimated geographic distribution of excess demand for water resources (surface and sub-surface) in Vörösmarty, et al. (2000). We use GIS to compute the total population residing in excess-demand areas identified by this research. The second information source is a database of deaths and injuries from floods maintained by the Centre for Research on the Epidemiology of Disasters (CRED, Université Catholique de Louvain). For each of the Bank's partner countries, we calculate the sum of deaths and injuries for all recorded floods since 1960. In constructing an indicator for flood damage, we weight deaths to injuries in the ratio 50:1. Using equal weights, we combine our indicators for demand pressure and floods into a composite indicator of water-related problems.[4]

We derive our indicator for environmental policy and institutional problems from two sources. The first is the World Bank's Country Policy and Institutional Assessment (CPIA) database, which rates environmental policies and institutions on a numerical scale of 1 (the lowest) to 6. For this exercise, we reverse the scaling (1 becomes the highest) and normalize the ratings so that countries with the greatest problems score 100. To proxy the scale of the problems confronted by environmental institutions, we compute the mean value of our five thematic indicators (global emissions, pollution, natural resource degradation, biodiversity threats, water-related problems).[5,6] To assure equal weighting

[4] Our index of demand pressure also provides a useful proxy for economic damage from drought conditions. We are indebted to our colleagues in the Bank's Middle East / North Africa region for this observation.

[5] While the CPIA ratings provide useful information for comparing institutional needs, they are not sufficient for judging investment priorities because they do not account for differences in the scale of environmental problems faced by a country's institutions. If Brazil and Bhutan receive the same CPIA rating, for example, ignoring their scale difference will lead to assignment of identical lending in the optimization model.

[6] We recognize that an equal-weighted index is only one of numerous plausible indicators for general environmental problems. In Appendix 2, we develop alternative indices and analyze their association with

with the institutional rating, we normalize this mean indicator to the range [0 - 100]. Our composite indicator is the product of the normalized environmental index and CPIA rating.

Table 2.1 illustrates the calculation of the policies and institutions indicator for four countries in Sub-Saharan Africa. This indicator (row 8) equals the product of the indicator of institutional development problems (row 7) and the indicator of overall environmental problems (row 6). The latter is the average of problem indicator values for global emissions, pollution, fragile lands, biodiversity and water resources. The four country cases illustrate the contributions of separate components to the final indicator values. Chad has a low overall environmental indicator (.69) but a very high institutional indicator (5), yielding a product of 3.44. South Africa's overall environmental indicator (4.24) is about six times Chad's value, but its institutional indicator (2) is much lower because its institutions are more highly-developed. The resulting composite indicator for South Africa (8.49) is about 2.5 times Chad's indicator value (3.44). Kenya has about the same composite indicator value as South Africa (8.35), but the indicator components are quite different. Kenya's environmental indicator (2.39) is somewhat more than half of South Africa's (4.24), but Kenya's institutional problem indicator (3.5) is about 1.8 times South Africa's. As a result, the products of the two indicators are nearly the same for the two countries. Of the four countries, Nigeria has by far the largest composite indicator value (25.29) because of the size of its overall environmental indicator (8.43).

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the equal-weighted index. Our results show that correlations among the indicators remain at .95 or higher, over a broad range of plausible definitions.

Table 2.1 Environmental Policies and Institutions Indicators for Four African Countries

	Country	Chad	Kenya	South Africa	Nigeria
1	Global Emissions	0.45	1.35	8.43	7.26
2	Pollution	1.09	1.89	1.14	12.92
3	Fragile Lands	0.94	3.27	4.60	12.52
4	Biodiversity	0.53	4.15	2.90	6.67
5	Water Resources	0.44	1.27	4.15	2.77
6	Overall Environmental Indicator	0.69	2.39	4.24	8.43
7	Institutional Development Problems	5.00	3.50	2.00	3.00
8	Environmental Policies and Institutions Indicator	3.44	8.35	8.49	25.29

3. Country Experience with Project Implementation

The World Bank lends to countries that have highly-varied experiences with implementation. To incorporate this factor, we draw on a database maintained by the World Bank's Operations Evaluation Department (OED). The database rates the outcomes of 3,075 World Bank projects implemented in 146 countries since 1990. OED rates projects in eight categories: highly satisfactory, satisfactory, moderately satisfactory, marginally satisfactory, marginally unsatisfactory, moderately unsatisfactory, unsatisfactory, and highly unsatisfactory. We interpret the highest two ratings as "successful" for our purposes, and define our country risk indicator as the percentage of projects rated successful by OED. Table 3.1 displays the distribution of our results by region. Although the estimated success rates are generally highest in Eastern Europe/Central Asia and lowest in Sub-Saharan Africa, countries in all Bank regions except South Asia exhibit a wide range of variation.

Table 3.1: Distribution of Country Probabilities of Project Success, by Region

Region	Min	Median	Max
Sub-Saharan Africa	0	64	100
Middle East, North Africa	0	71	100
South Asia	69	71	100
East Asia, Pacific	33	76	100
Latin American, Caribbean	0	76	100
East Europe, Central Asia	0	83	100

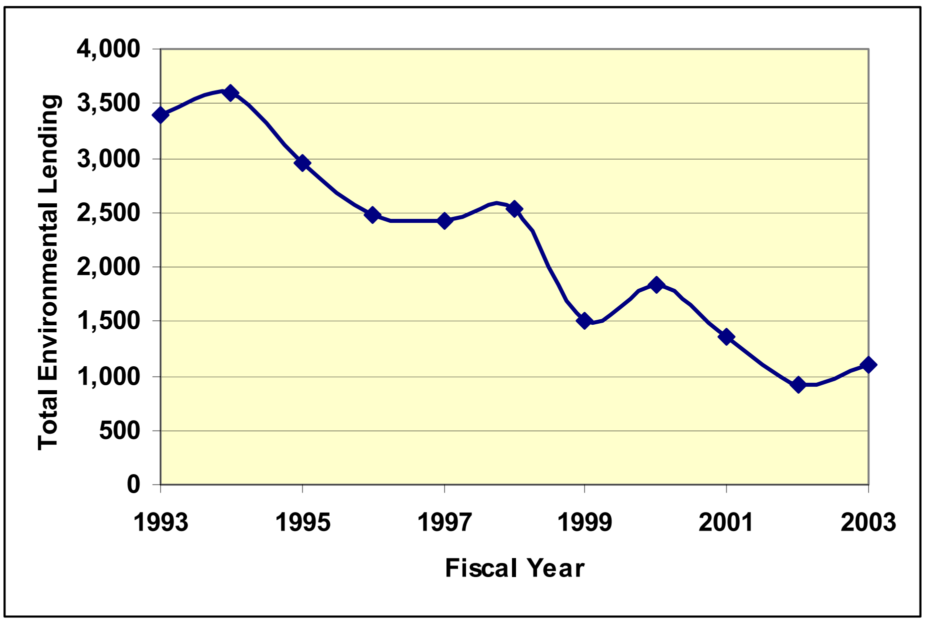
4. Environmental Resource Allocation by the World Bank

The World Bank's Environment Department has recently completed an accounting of environmental lending and AAA in seven thematic categories: climate change, pollution management, land management, biodiversity, water resource management, environmental policies and institutions, and other environmental management. This exercise has drawn on recent changes in the Bank's accounting system, which now tracks the allocation of funds across both sectors (e.g., environment, infrastructure) and themes within sectors (e.g., climate change, pollution management). The new system identifies the environmental components of projects whose sectoral identification is non-environmental. For example, transport-related projects often include components that promote reduction of vehicular air pollution.

This paper draws on information for all World Bank projects approved since FY 1998, and all AAA since FY 2000. Using the appropriate thematic codes, we calculate total Bank lending and AAA by country and environmental theme. Our five environmental indicators and the institutional problem indicator are constructed to match the corresponding thematic categories in the project database. The seventh thematic category (other environmental management) has no direct analog, so we use the mean value of the five environmental indicators for our matching exercise.

Perhaps the most striking feature of the Bank's environmental lending is the stability of its thematic allocation over time.[7] As Figure 4.1 shows, annual environmental lending declined from around $3.5 billion in FY 1993 to $1.0 billion in FY 2003. Despite this sharp change in aggregate lending, the regression results in Table 4.1 suggest that thematic shares remained stable: None exhibits a significant time trend since 1993.

Figure 4.1 World Bank Environmental Lending, 1993-2003 ($US Million)



[7] We have not analyzed thematic trends for AAA, since the available time interval is much shorter.

Table 4.1: Trend Tests for Thematic Shares

	Climate	Pollution	Land	Biodiversity[8]	Water	Policy	Other
Time	0.318	-0.167	0.639	0.074	0.008	-1.071	0.199
	(0.63)	(0.19)	(1.38)	(0.37)	(0.01)	(1.65)	(1.09)
Constant	8.337	33.404	8.529	2.215	20.456	24.930	2.128
	(2.44)*	(5.54)**	(2.72)*	(1.61)	(5.86)**	(5.67)**	(1.71)
Obs.	11	11	11	11	11	11	11
R-squared	0.04	0.00	0.17	0.01	0.00	0.23	0.12

Absolute values of t statistics in parentheses
* significant at 5%; ** significant at 1%

Produced by thousands of interactions between the Bank and its partner countries, these results suggest very strong continuity in the relative valuation of thematic objectives. We will return to this point in Section 7, which develops a model for the optimal allocation of environmental resource allocation by the Bank.

5. How Has Environment Mattered in the Aggregate?

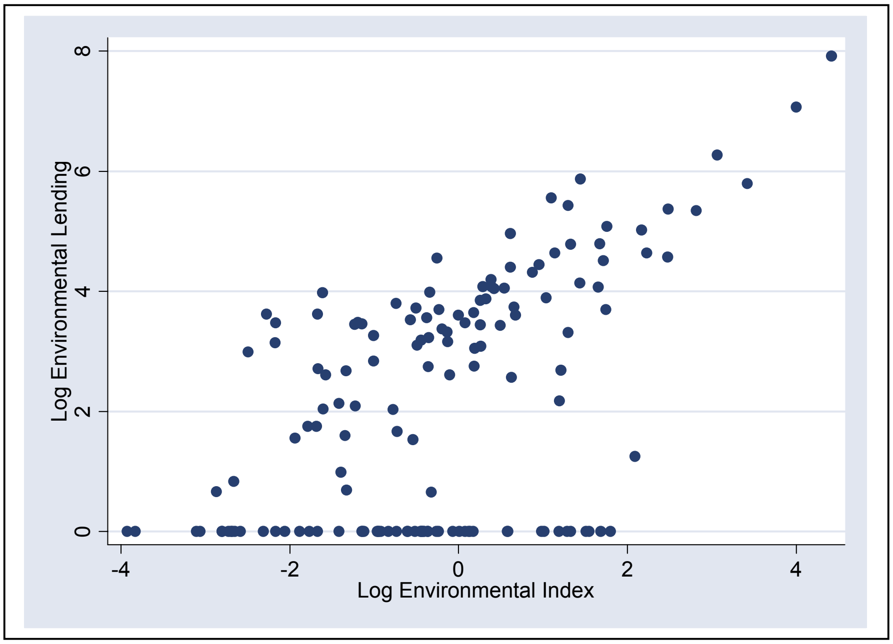
We begin our assessment by analyzing the match between environmental lending, AAA and environmental problems at the country level. Our overall environmental indicator is the mean of the five thematic indicators.[9] We use log values for the analysis because the size distributions of country indicators and resource allocations are extremely

[8] For biodiversity, our data include only Bank lending. Grants by the Global Environment Facility (GEF) for biodiversity conservation are not included in this analysis, but the GEF is currently conducting a parallel analysis of its own resource allocation.

[9] All indicators are normalized to the range [0-100], so they have equal weight in determining the mean indicator.

skewed.[10] As the scatter plot in Figure 5.1 suggests, the association between overall environmental problems and lending is very strong for those countries that have received environmental loans.

Figure 5.1: World Bank Environmental Lending vs. Overall Environmental Problems (Log Scale)



In a log-log regression of environmental lending on the overall environmental indicator (Table 5.1, column 1), the estimated response elasticity is .70, with an associated t-statistic of 10.3 and regression R^2 (adjusted for degrees of freedom) of .53.

[10] Conventional regression and correlation analysis assume that variable distributions do not contain extreme "outlier" observations, because such outliers can sharply skew the results. In this case, both nominal and per-capita distributions are extremely skewed. Log measures, on the other hand, have regular, approximately-normal distributions with no outliers.

Table 5.1: Determinants of Environmental Lending

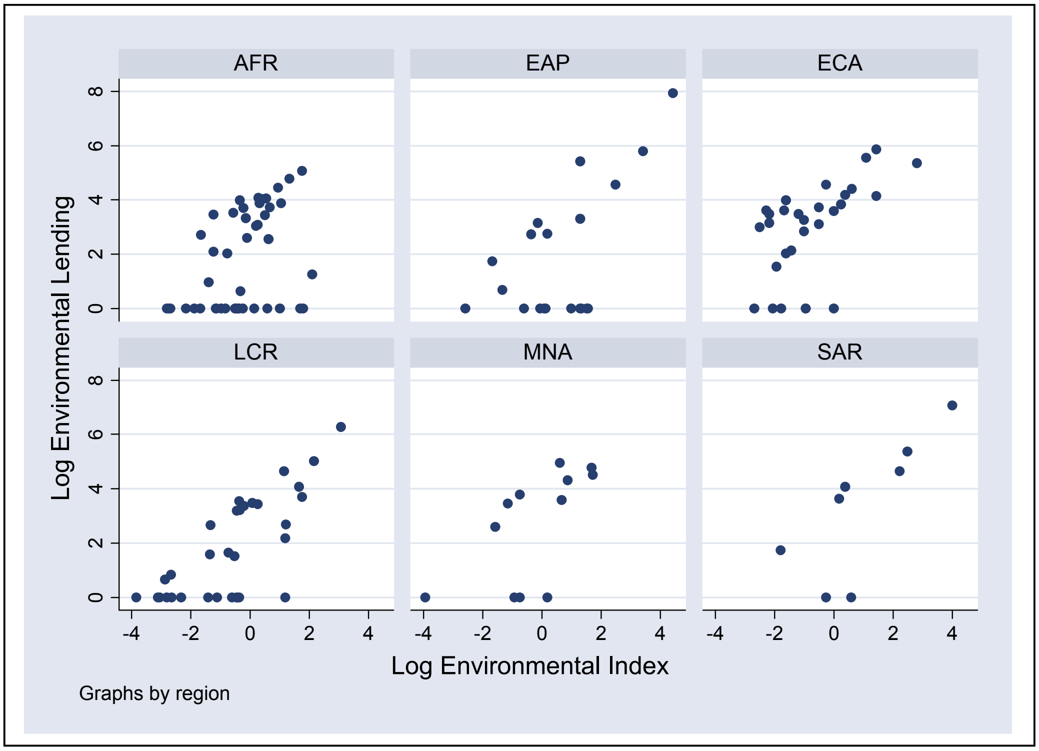
	Environmental Lending[a]			Environmental AAA[b]		
	(1)	(2)	(3)	(4)	(5)	(6)
Log Overall Env.	0.700	0.425	0.457	0.305	0.433	0.407
Indicator	(10.35)**	(5.08)**	(4.91)**	(2.94)**	(3.03)**	(2.45)*
Log Bank Non-Env.		0.437	0.402		-0.120	-0.018
Lending		(5.34)**	(4.70)**		(0.68)	(0.09)
Log Bank Env.					0.015	0.006
Lending					(0.22)	(0.08)
Log OED Success		1.149	1.071		0.864	0.969
Probability		(3.35)**	(2.97)**		(1.41)	(1.41)
AFR (Sub-Saharan Africa)			0.245			0.474
			(0.97)			(0.72)
EAP (East Asia, Pacific)			0.367			0.878
			(1.14)			(1.28)
ECA (Europe, Central Asia)			0.813			0.388
			(3.25)**			(0.69)
MNA (Middle East, N. Africa)			0.714			0.058
			(2.02)*			(0.08)
SAR (South Asia)			0.459			-0.375
			(1.21)			(0.47)
Constant[c]	3.363	-4.160	-4.015	4.292	1.227	-0.169
	(31.89)**	(2.85)**	(2.64)**	(26.51)**	(0.44)	(0.05)
Observations	92	91	91	63	59	59
R-squared	0.54	0.70	0.75	0.12	0.22	0.27
Adj. R-Sq.	0.53	0.69	0.72	0.11	0.16	0.14

Absolute value of t statistics in parentheses
significant at 5%; ** significant at 1%

[a] Limited to countries with environmental lending
[n] Limited to countries with environmental AAA
[c] LCR (Latin America, Caribbean) is the excluded regional dummy variable.

This result suggests that a 1% increase in overall environmental problems is associated with a .70% increase in environmental lending. At the regional level, Figure 5.2 also suggests a good correspondence between overall environmental problems and environmental lending in countries where such lending has occurred. The relationship is very strong in East and South Asia (EAP, SAR), but it is also apparent in the other regions. However, all regions (particularly AFR and LCR) include countries that have no lending, despite significant environmental problems.

Figure 5.2: World Bank Environmental Lending by Region vs. Overall Environmental Problems (Log Scale)



The number of such zero-lending cases suggests that the Bank's interaction with these countries has been affected by other factors. We introduce broader considerations into our regressions by including the Bank's total country lending and countries' OED project success rates, as well as regional differences. The results in columns 2 and 3 of Table 5.1 suggest that the Bank's overall lending relationship with a country and the country's project success rate are both significant determinants of environmental lending. The results in column 3 also indicate a significant component of environmental lending to two regions (ECA, MNA) that is not accounted for by our environmental problem indicator, project success rates, or other Bank lending.

Our results for total Bank lending are uniformly significant at the 99% level, and the results for the OED ratings are significant at the 95% level or higher. The parameter estimates suggest that a 1% increase in Bank lending is associated with a .4% increase in environmental lending, and a 1% increase in the OED rating is associated with an environmental lending increase of about 1%. Once we control for these two factors, environmental problems retain a significant impact on environmental lending at the 99% level. However, the estimated response elasticity drops from .70 to around .45.

The results for AAA in Figure 5.1 are quite different from the results for lending. The association with environmental problems is uniformly significant at the 99% confidence level, but we find no significance for environmental lending, non-environmental lending, the OED success probability, or any regional dummies. R-squares for the AAA regressions are much lower than R-squares for lending, suggesting a much greater random component in the allocation of AAA resources.

6. Allocation by Environmental Theme

From an institutional perspective, our overall results for lending are encouraging because they suggest that large, politically-difficult reallocations across countries would not generally be necessary to bring country lending into alignment with overall environmental problems. The implications for AAA may be more serious, since our results suggest that the association between AAA and environmental problems explains only a small component of the cross-country variation in AAA.

We extend the analysis to the thematic level, by regressing lending and AAA for each theme on the associated environmental problem indicator (Table 6.1). The results for lending suggest strong relationships that mirror the overall relationship captured by

Table 5.1 For each of the six themes, lending is positively associated with the relevant indicator at a very high level of significance. Estimated elasticities are generally near 0.5, except for biodiversity (0.3) and policies and institutions (1.2). However, the low R-squares suggest that most thematic lending is determined by other factors. For AAA, the results are even weaker. Regression R-squares are extremely low, and thematic AAA is not significantly associated with the relevant thematic indicator in 3 of 6 cases. We find positive, significant associations for climate change, water resources and policies and institutions.

Overall, the relationship between AAA allocations and indicator values appears to be nearly random. Although our results indicate significant relationships between lending and environmental problems, the low R-squares also imply considerable scope for better matching between needs and resources. In the following sections, we develop and implement a model that we believe can assist in this task.

7. Optimal Thematic Lending and AAA

Following Buys, et. al (2003), we model the welfare impact of World Bank investments as a function of their levels and distributions across countries. We recognize that the Bank must strike a balance between country representation and global welfare maximization in its resource allocation decisions. To reflect this balance, we assume that the Bank's welfare function is characterized by unit-elastic substitution across countries. A unit-elastic (Cobb-Douglas) function permits tailoring of programs to a country's circumstances, while encouraging portfolio diversification through the operation of diminishing returns. In our model, expected welfare gains from Bank investments are related to both the scale of a

Table 6.1: Regression Results: Thematic Lending, AAA and Environmental Indicators

Environmental Thematic Lending vs. Thematic Indicator Values
(Limited to Countries with Environmental Lending)

Log Environmental Indicators	Climate	Pollution	Land	Biodiversity	Water	Policies
Climate	0.469					
	(2.86)**					
Pollution		0.460				
		(3.30)**				
Land			0.459			
			(3.18)**			
Biodiversity				0.320		
				(3.32)**		
Water					0.553	
					(4.33)**	
Policies						1.214
						(6.26)**
Constant	-2.519	0.686	-0.572	-2.907	0.115	-0.996
	(7.51)**	(1.80)	(1.53)	(10.56)**	(0.30)	(3.09)**
Observations	92	92	92	92	92	91
R-squared	0.08	0.11	0.10	0.11	0.17	0.31
Adj. R-Sq.	0.07	0.10	0.09	0.10	0.16	0.30

Environmental Thematic AAA vs. Thematic Index Values
(Limited to Countries with Environmental AAA)

Log Environmental Indicators	Climate	Pollution	Land	Biodiversity	Water	Policies
Climate	0.680					
	(3.18)**					
Pollution		0.297				
		(1.14)				
Land			0.367			
			(1.36)			
Biodiversity				0.144		
				(0.77)		
Water					0.522	
					(2.23)*	
Policies						1.131
						(3.34)**
Constant	-3.142	-1.454	-2.653	-2.163	-0.379	-1.016
	(8.05)**	(2.87)**	(5.98)**	(4.68)**	(0.74)	(1.80)
Observations	63	63	63	63	63	63
R-squared	0.14	0.02	0.03	0.01	0.08	0.15
Adj. R-Sq.	0.12	0.00	0.01	0.00	0.06	0.14

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

country's environmental problems and the probability that projects will be successful under local conditions. We assume that the Bank assigns the same opportunity values to human life, health and natural resource savings in all of its partner countries. From these assumptions, we derive a simple optimal allocation rule (Buys, 2003): *For a particular environmental theme (e.g., pollution, threats to biodiversity), each country's optimal share of available lending and AAA resources is proportional to the product of its problem scale and the probability of project success.*

Do our assumptions, and the resulting allocation rule, actually reflect the Bank's operational experience? To check for general consistency, we have estimated cross-country equations in which the log of the Bank's environmental lending and AAA are regressed on the logs of the overall environmental index and the OED measure of success probability (Table 7.1). Our simple allocation rule implies that the parameters of both variables are equal to one. Using the standard F-test for the lending and AAA equations, we find that these parameter values cannot be rejected at the standard significance level (5%) in either case. We conclude that the Bank's environmental lending and AAA have been broadly consistent with our allocation rule. However, the high degree of unexplained variation in both regressions suggests large gaps between actual and optimal allocation in many cases.

Our model addresses the allocation problem within each environmental theme, but it cannot determine thematic allocations from total lending resources. However, our historical results for thematic lending shares (Section 4) have strong significance in this context. The stability of these shares, in the face of sharp changes in total environmental lending, suggests a clear pattern of preferences underlying the Bank's many transactions with partner countries. We accept these overall preferences, and assume that future thematic lending shares will be identical to the lending shares for the period 1998 - 2003.

Table 7.1: Tests of the Cobb-Douglas Allocation Rule: Environmental Lending and AAA
(Standard errors in parentheses)

	Log Lending	Log AAA
Log Environmental Problem Indicator (EPI)	1.136 (0.18)**	1.265 (0.21)**
Log OED Success Probability (OSP)	2.602 (0.73)**	1.143 (0.87)
Constant	-9.960 (3.09)**	-5.099 (3.67)
Observations	139	139
R-squared	0.28	0.21
Adj. R-Squared	0.27	0.20
F [EPI = OSP = 1]	**2.65**	**0.78**
Prob. > F	**0.07**	**0.46**

significant at 5%; ** significant at 1%

We also use the lending shares as guidelines for AAA, since the Bank's analytical and advisory activities are supposed to serve its lending program.

Table 7.2 presents percent changes associated with movement from actual to optimal lending by sector and region. In Sub-Saharan Africa, for example, the overall gap between actual and optimal environmental lending is small (+5%), but thematic gaps vary from around -40% for climate change and biodiversity to +64% for land. South Asia has a relatively large overall gap (+33%), and thematic gaps ranging from -60% or less for biodiversity and climate change to over +180% for land and water resources. In a strongly-contrasting pattern, Latin America and the Caribbean have a relatively large overall gap (-26%), with increases for climate change (+127%) and biodiversity (+17%) and decreases for land and water resources (-70% and -9%, respectively). Across regions, moving from actual to optimal lending results in increases for Africa (5%), East Asia / Pacific (20%) and South Asia (33%), and decreases for Europe / Central Aisa (-57%), Latin America / Caribbean (-26%) and Middle East / North Africa (-19%).

Table 7.2: % Differences Between Actual and Optimal Lending[a]

Region	Climate	Pollution	Land	Biodiversity	Water	Policies	Other	Total
AFR	-41	30	64	-44	13	0	-65	5
EAP	23	21	27	90	-14	57	99	20
ECA	-15	-46	-85	-70	-61	-61	-26	-57
LCR	127	-30	-70	17	-9	-40	-16	-26
MNA	*	-20	138	*	-63	-20	97	-19
SAR	-62	-4	181	-69	212	14	-12	33
Total	0	0	0	0	0	0	0	

[a] Estimates reflect changes from actual to optimal lending
* Division by 0 in growth rate calculation

Tables 7.4 and 7.5 present % differences for AAA under two assumptions. Table 7.4 holds thematic AAA shares constant at their levels for 2000-2003, while Table 7.5 assumes that thematic AAA shares are equal to thematic lending shares for 1998-2003. The differences between the two tables are evident, reflecting the substantial differences between thematic shares for lending and AAA in Table 7.3. Lending shares are higher for climate, pollution, land and water, while AAA shares are higher for biodiversity and environmental policies and institutions. The difference for pollution is particularly striking (31% of lending vs. 10% of AAA).

Table 7.3: Thematic Shares for Lending (1998-2003) and AAA (2000-2003)

Resource	Climate	Pollution	Land	Biodiversity	Water	Policies	Other
Lending	10	31	15	3	23	15	4
AAA	4	10	7	10	19	27	21

At the regional level, Tables 7.4 and 7.5 show that the change in assumptions makes little difference for allocations. Whether or not thematic lending shares are used for

AAA allocation, the pattern of regional change in AAA is similar to the pattern for lending (with the exception of Africa): Two regions have increases in AAA (East Asia / Pacific, South Asia) and four regions have decreases (Africa, Europe / Central Asia, Latin America / Caribbean and Middle East / North Africa). Furthermore, the magnitudes of overall regional changes are almost identical in Tables 7.4 and 7.5 (again, Africa excepted)

However, changing thematic shares from the AAA allocation to the lending allocation has a large impact on thematic results. Moving to the lending allocation (Table 7.5) entails very large increases for three sectors (climate (118%), pollution (198%), land (107%) and large decreases for two (biodiversity (-73%), policies and institutions (-44%)). Overall, combining these changes with regional shifts generates much larger regional % changes within sectors in Table 7.5 than in Table 7.4. In some cases, change patterns are replicated in the two tables (e.g., large % increases in climate, pollution and land for EAP; decreases for all themes except water in ECA). However, other patterns are reversed, particularly for biodiversity, which gets a much larger allocation in Table 7.4 (10% of total AAA) than in Table 7.5 (3% of total lending).

Table 7.4: % Differences Between Actual and Optimal AAA
(AAA Thematic Shares Held Constant)

Region	Climate	Pollution	Land	Biodiversity	Water	Policies	Other	Total
AFR	-35	20	-62	-75	-81	146	-56	-52
EAP	171	271	411	222	50	-8	88	61
ECA	-63	-83	-65	-87	2	-66	-71	-68
LCR	473	64	-86	90	13	25	-26	-7
MNA	-5	-59	279	-12	-69	19	-49	-39
SAR	-62	9	2,273	100	366	59	1,313	144
Total	0	0	0	0	0	0	0	0

Table 7.5: % Differences Between Actual and Optimal AAA
(AAA Thematic Shares = Lending Thematic Shares)

Region	Climate	Pollution	Land	Biodiversity	Water	Policies	Other	Total
AFR	42	258	-20	-93	-77	37	-92	-52
EAP	490	1,007	955	-14	76	-49	-67	56
ECA	-20	-48	-28	-97	20	-81	-95	-66
LCR	1,150	388	-70	-49	33	-30	-87	-18
MNA	108	24	684	-76	-63	-34	-91	-37
SAR	-17	224	4,804	-47	448	-11	146	166
Total	118	198	107	-73	18	-44	-83	0

Our results also suggest possible differences in the relative magnitudes of thematic changes for lending and AAA. Appendix Table 2 presents results for actual and optimal lending and AAA across sectors and regions. We estimate the relative magnitudes of thematic gaps by calculating the absolute values of regional thematic gaps as percentages of actual thematic allocations. For each theme, the sum of absolute-value percentage gaps provides an indicator of relative "misallocation". Table 7.6 summarizes the results for three cases: lending, AAA (A -- with thematic AAA shares), and AAA (L -- with thematic lending shares). Both nominal and rank correlations suggest that misallocations are most closely matched for lending and AAA(A) shares; poorly matched for lending and AAA(L); and weakly matched for AAA(A) and AAA(L). We conclude that statements about thematic misallocation are highly sensitive to the comparison standard, and general conclusions do not seem appropriate.

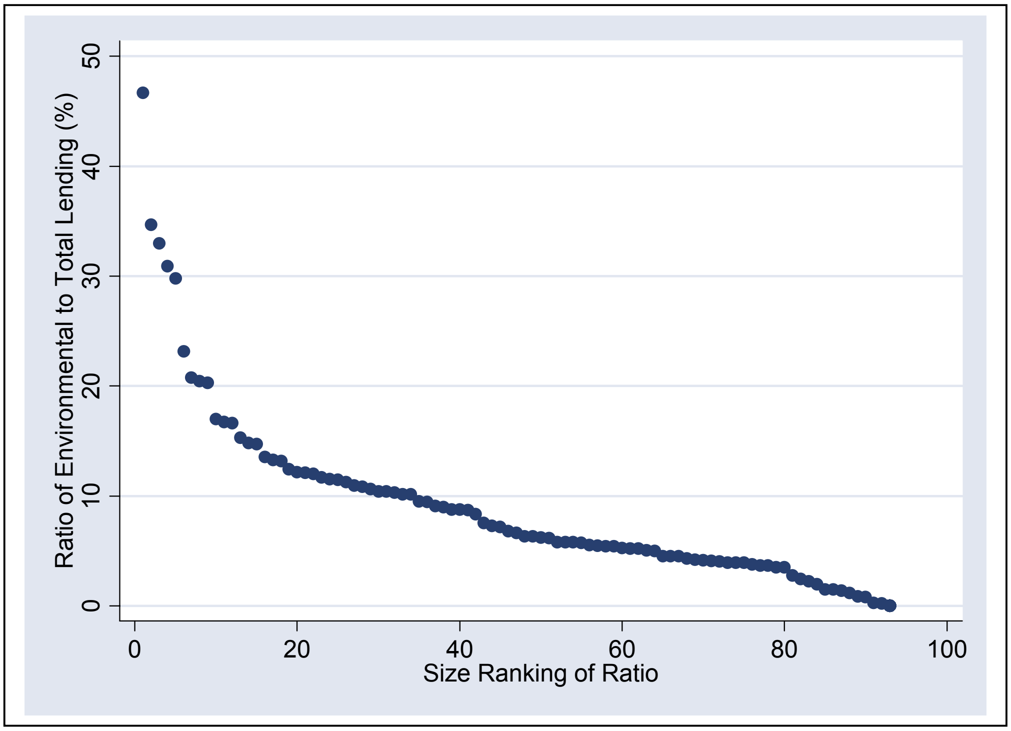
Table 7.6: Thematic Misallocation Measures

Numerical data						
Theme	Lending	AAA (A)	AAA (L)		Lending	AAA(A)
Climate	45	89	142	AAA(A)	0.67	
Pollution	22	82	239	AAA(L)	-0.32	0.45
Land	70	127	181			
Biodiversity	68	105	73			
Water	49	83	96			
Policies	38	35	48			
Ranks						
Theme	Lending	AAA (A)	AAA (L)		Lending	AAA(A)
Climate	4	3	3	AAA(A)	0.89	
Pollution	6	5	1	AAA(L)	-0.09	0.26
Land	1	1	2			
Biodiversity	2	2	5			
Water	3	4	4			
Policies	5	6	6			

8. Future Opportunities for Thematic Lending

To assess future opportunities, we assume that total environmental lending during the period 2004-2009 will be identical to lending during 1998-2003 ($9.2 billion). For each country, the optimal share of environmental lending by theme is proportional to the product of the country's thematic indicator and its OED success probability. To calculate optimal lending, we multiply each country's optimal thematic share by total thematic lending for the period 1998-2003. Then we add across themes to obtain total optimal lending for each country. Recognizing that the Bank may limit its lending to some countries for a variety of reasons, we derive a control factor from lending experience during the past six years. Across countries, the maximum ratio of environmental loans to total loans was 46%. As Figure 8.1 shows, most ratios were 10% or less.

Figure 8.1: Size Distribution of Ratios: Environment Lending / Total Lending, 1998 - 2003



Setting the maximum ratio at 40%, we identify a country's future environmental lending opportunity as the lower of two numbers: our estimate of total optimal environmental lending, or 40% of total lending during 1998 - 2003. With this control, the environmental lending opportunity is our optimal lending estimate for 83% of the 150 countries in our dataset. For the others, we use the 40% ratio to keep environmental lending within a plausible bound. Having determined the overall lending opportunity, we multiply by our optimal thematic shares to estimate thematic lending opportunities. We present the results in Appendix 1, with countries in each region sorted by total lending opportunity. The regional tables display historical lending, as well as future opportunities.

To illustrate, the six Sub-Saharan African countries with the highest environmental lending opportunities are Nigeria ($144 million), Ethiopia ($128 million), Tanzania ($76 m.), Uganda ($38 m.), Mozambique ($35 m.), Congo DR ($32 m.), and Madagascar ($30 m.). Our results suggest that lending opportunities are generally largest for pollution management, although sizable opportunities also exist for land management, water resource management, and environmental policies and institutions. The mix of opportunities differs substantially by country, reflecting differences in their environmental problems. Other regions exhibit similarly-diverse patterns.

We summarize our results Table 8.1, which includes all countries with environmental lending opportunities of $50 million or more during the period 2004-2009. Of the 23 countries listed, 7 are in the East-Asia Pacific Region (EAP), 4 in Latin America and the Caribbean (LCR), and 3 are in each of the other regions. If, as we assume, AAA priorities should reflect lending priorities, then these same 23 countries should also form the core group for AAA during the period 2004-2009. AAA priorities for other countries would reflect the same rank-order as the lending opportunities in Appendix 1.

9. Interpretation of Results: Ethiopia vs. Nigeria

We provide an illustrative interpretation of our results by comparing the cases of Ethiopia and Nigeria in Table 9.1. Both have been among the Bank's top borrowers in Sub-Saharan Africa: From 1998-2003, Nigeria borrowed $912 million and Ethiopia borrowed $1,381 million. Among the 48 Sub-Saharan countries, Nigeria's overall environmental problem indicator ranks first and Ethiopia's second. Both countries are in the midrange for the OED project success rate (45% for Nigeria; 65% for Ethiopia). After adjusting for success rates, Nigeria's optimal lending is $144 million and Ethiopia's is $128 million.

Table 8.1: Country Lending Opportunities, 2004-09

Region	Country	Lending Opportunity, 2004-09 ($ Million)
EAP	China	2,904
SAR	India	1,405
EAP	Indonesia	548
SAR	Bangladesh	345
SAR	Pakistan	299
LCR	Brazil	241
LCR	Mexico	186
ECA	Russian Federation	153
AFR	Nigeria	144
MNA	Iran (Islamic Republic of)	140
EAP	Philippines	138
EAP	Vietnam	138
MNA	Egypt, Arab Republic of	138
AFR	Ethiopia	128
EAP	Korea, Republic of	103
ECA	Turkey	102
ECA	Ukraine	99
EAP	Thailand	93
LCR	Argentina	87
EAP	Malaysia	78
AFR	Tanzania	76
LCR	Peru	56
MNA	Yemen, Republic of	50

With this information as background, it is instructive to compare actual total and thematic lending. Ethiopia's actual lending is in the same range as its optimal lending: $159 million. As Table 9.1 shows, Ethiopia ranks high in all environmental indicator categories except climate change. However, the pattern of thematic lending bears almost no relationship to Ethiopia's thematic rankings in Africa, or to its optimal thematic lending. Climate is the most obviously-divergent category, with optimal lending of $2.1 million and actual lending of $71.8 million. Lending amounts for pollution management and land and water resource management are far lower than the optimal levels, while lending for policies and institutions is substantially higher.

Nigeria's case is even more divergent than Ethiopia's. Despite the highest ranking in Sub-Saharan Africa for environmental problems and $144 million in optimal lending, Nigeria's actual lending is only $2.5 million. Two themes – pollution and water resource management – have very small loans, and the others none at all.

Table 9.1 Environmental Indicator and Lending Status of Ethiopia and Nigeria Within Sub-Saharan Africa

	Climate	Pollution	Land	Biodiversity	Water	Policies	Overall
Ethiopia							
Indicator Rank	11	2	3	2	3	2	2
Actual Lending	71.8	31.8	0.0	0.7	5.1	33.4	159.2
Optimal Lending	2.1	57.7	23.2	2.8	18.9	18.9	127.5
Nigeria							
Indicator Rank	3	1	1	3	4	1	1
Actual Lending	0.0	1.3	0.0	0.0	1.3	0.0	2.5
Optimal Lending	7.4	70.3	29.2	1.9	9.7	20.9	143.6

9. Summary and Conclusions

In this paper, we have used new environmental and accounting information to address four questions about the World Bank's environmental lending:

(1). Have the Bank's patterns of country environmental lending and AAA reflected cross-country differences in environmental problems?

Our evidence suggests an affirmative answer for both lending and AAA. At the country level, we find a strong association between both environmental lending and AAA and the overall severity of environmental problems. This association remains strong after we adjust allocations for project risks.

(2). Within countries, have the Bank's thematic lending and AAA reflected the relative incidence of thematic problems?

The evidence here is mixed. For each of the six themes, lending is positively associated with the relevant environmental indicator at a very high level of significance. However, the low R-squares for our regressions suggest that most thematic lending is determined by other factors. For AAA, the results are even weaker, suggesting a nearly-random relationship between risk-adjusted environmental priorities and resource allocation.

(3) If resource allocation is not aligned with problems, how large a change would re-alignment entail?

All of our results assume that future resources for environmental lending and AAA will be equal to resources during the past several years. If more resources become available, it might well be possible to increase lending and AAA for all regions and themes.[11] With fixed resources, however, both our lending and AAA results imply significant reallocations from ECA and MNA to EAP and SAR. For AFR, our results suggest a modest increase in lending and a significant decrease in AAA. Both lending and AAA results suggest moderate decreases for LCR. If we adopt lending shares for AAA, our results also suggest large increases in AAA for climate change, pollution, and management of land and water resources, and substantial decreases for biodiversity and environmental policies and institutions.

[11] Even if more resources were available, of course, relative optimal allocations would reflect the patterns displayed by our fixed-resource allocations.

(4) To achieve a good match in the future, how should the Bank identify a desirable portfolio of environmental lending in each partner country?

Using our optimal allocation model, we have developed estimates of thematic opportunities for the Bank's lending and AAA for the period 2004-2009. We recognize that these estimates (in Appendix 1) can only be suggestive, since the lending process is complex and uncertain. In addition, thematic opportunities in some countries may well be captured by other donors. Nevertheless, the numbers in Appendix 1 reflect an important new body of comparative information. We hope that our opportunity estimates will provide useful insights for our colleagues in the Bank, our partner countries, and other donor institutions.

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Appendix 1

Environmental Lending Opportunities by Bank Region:
($US Million)

Sub-Saharan Africa (AFR)
East Asia and Pacific (EAP)
Europe and Central Asia (ECA)
Latin American and Caribbean (LCR)
Middle East and North Africa (MNA)
South Asia (SAR)

SUB-SAHARAN AFRICA	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
Nigeria	3	144	912	144	7	70	29	2	10	21	4
Ethiopia	159	128	1381	128	2	58	23	3	19	19	4
Tanzania	118	76	1144	76	3	21	12	5	12	19	3
Uganda	56	38	1430	38	2	12	11	1	6	5	1
Mozambique	30	35	863	35	1	12	4	2	6	8	2
Democratic Republic of the Congo	0	32	954	32	3	12	8	1	2	6	1
Madagascar	48	30	829	30	3	10	4	2	2	8	1
Kenya	12	29	535	29	1	9	7	1	4	6	1
Zimbabwe	47	29	136	29	3	7	8	1	4	6	1
Burkina Faso	27	27	505	27	1	7	9	0	6	4	1
Angola	0	26	88	26	1	14	5	0	1	4	1
Niger	21	26	385	26	0	7	7	0	7	4	1
Ghana	58	23	1112	23	2	7	5	1	4	4	1
Chad	33	22	437	22	1	10	4	0	3	5	1
Cote d'Ivoire	41	22	658	22	3	8	4	1	1	4	1
Senegal	53	22	857	22	1	9	5	0	5	2	1
Eritrea	20	21	397	21	0	4	5	3	4	4	1
Zambia	84	21	884	21	6	7	2	0	1	4	1
Mali	39	20	385	20	1	7	6	0	3	3	1
Malawi	1	13	483	13	1	4	1	0	3	2	0
Benin	0	11	144	11	2	4	2	0	2	2	0
Guinea	13	11	319	11	1	5	3	0	0	1	0
Cameroon	57	9	467	9	1	4	2	0	0	2	0
Mauritania	31	8	279	8	0	4	1	0	2	1	0
Burundi	2	6	209	6	0	1	1	0	1	1	0
Rwanda	7	6	445	6	0	2	2	0	1	1	0
Sierra Leone	0	6	239	6	0	3	1	0	0	1	0
South Africa	0	87	15	6	1	1	1	0	2	1	0
Togo	0	4	111	4	0	1	1	0	1	1	0
Central African Republic	0	2	60	2	0	1	0	0	0	0	0
Djibouti	0	2	91	2	0	0	0	0	0	1	0
Gambia	0	2	99	2	0	1	0	0	0	0	0
Guinea Bissau	0	2	63	2	0	1	0	0	0	0	0
Lesotho	14	2	113	2	0	1	1	0	0	0	0
Comoros	0	1	37	1	0	0	0	0	0	1	0
Congo	0	1	131	1	0	1	0	0	0	0	0
Gabon	0	1	5	1	0	0	0	0	0	0	0
Mauritius	7	1	59	1	0	0	0	1	0	1	0
Botswana	0	4	0	0	0	0	0	0	0	0	0
Cape Verde	4	0	127	0	0	0	0	0	0	0	0
Equatorial Guinea	0	0	0	0	0	0	0	0	0	0	0
Liberia	0	0	0	0	0	0	0	0	0	0	0
Namibia	0	4	0	0	0	0	0	0	0	0	0
Sao Tome and Principe	0	0	10	0	0	0	0	0	0	0	0
Seychelles	0	1	0	0	0	0	0	0	0	0	0
Somalia	0	7	0	0	0	0	0	0	0	0	0
Sudan	0	64	0	0	0	0	0	0	0	0	0
Swaziland	0	2	0	0	0	0	0	0	0	0	0

EAST ASIA, PACIFIC	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
China	2744	2904	8881	2,904	205	1090	468	37	702	310	93
Indonesia	328	548	4958	548	107	104	58	47	38	162	33
Philippines	96	138	1515	138	7	23	6	23	17	51	10
Vietnam	227	138	2505	138	4	48	30	7	16	27	6
Korea, Republic of	0	103	7048	103	22	31	6	0	31	10	4
Thailand	0	93	2080	93	13	25	11	6	16	16	5
Malaysia	0	78	704	78	37	3	7	5	1	19	6
Cambodia	22	27	310	27	5	8	3	1	2	6	1
Papua New Guinea	26	22	195	22	3	2	2	3	0	10	2
Lao People's Democratic Republic	15	8	176	8	1	1	2	0	1	2	0
Mongolia	15	6	166	6	1	1	0	0	2	1	0
Solomon Islands	0	6	16	6	0	0	0	1	0	3	1
Samoa	5	1	23	1	0	0	0	1	0	1	0
Tonga	1	1	6	1	0	0	0	0	0	1	0
Vanuatu	0	3	4	1	0	0	0	0	0	1	0
Federated States of Micronesia	0	5	0	0	0	0	0	0	0	0	0
Fiji	0	22	0	0	0	0	0	0	0	0	0
Kiribati	0	3	0	0	0	0	0	0	0	0	0
Marshall Islands	0	0	0	0	0	0	0	0	0	0	0
Myanmar	0	72	0	0	0	0	0	0	0	0	0
Palau	0	0	0	0	0	0	0	0	0	0	0

EUROPE, CENTRAL ASIA	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
Russian Federation	208	153	4978	153	47	36	8	1	26	28	7
Turkey	352	102	7779	102	11	49	9	1	15	14	3
Ukraine	62	99	1517	99	20	37	4	0	20	14	3
Poland	259	49	1264	49	13	19	0	0	10	3	2
Uzbekistan	80	37	347	37	4	8	6	1	10	7	1
Kazakhstan	65	31	965	31	6	4	5	0	8	5	1
Romania	46	25	1259	25	5	6	2	0	8	3	1
Bulgaria	94	20	868	20	3	12	1	0	3	2	1
Georgia	40	17	462	17	1	11	1	0	1	2	0
Azerbaijan	36	16	397	16	1	5	2	0	3	3	1
Armenia	25	13	456	13	0	6	1	0	3	2	0
Hungary	21	12	368	12	3	3	1	0	4	1	1
Kyrgyz Republic	32	12	276	12	0	2	3	0	5	2	0
Tajikistan	16	12	255	12	0	2	3	0	3	3	0
Yugoslavia	0	9	408	9	2	2	2	0	2	2	0
Belarus	7	7	23	7	3	0	0	0	2	1	0
Republic of Moldova	7	6	273	6	0	1	1	0	2	1	0
Slovakia	0	6	206	6	2	0	1	0	1	1	0
Bosnia-Herzegovina	36	5	627	5	1	1	1	0	0	1	0
Albania	22	4	427	4	0	1	1	0	1	1	0
Lithuania	36	4	218	4	1	2	0	0	1	0	0
Croatia	52	3	518	3	1	1	1	0	1	0	0
Estonia	0	2	694	2	1	0	0	0	0	0	0
FYR Macedonia	31	2	331	2	0	0	0	0	0	0	0
Latvia	19	2	167	2	1	1	0	0	0	0	0
Slovenia	4	2	25	2	1	0	0	0	0	0	0
Cyprus	0	2	0	0	0	0	0	0	0	0	0
Czech Republic	0	13	0	0	0	0	0	0	0	0	0
Turkmenistan	0	0	0	0	0	0	0	0	0	0	0

LATIN AMERICA, CARIBBEAN	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
Brazil	527	241	9073	241	77	35	15	9	37	54	13
Mexico	151	186	7701	186	23	48	21	5	56	25	8
Argentina	58	87	6892	87	12	42	1	0	19	11	3
Peru	39	56	998	56	10	15	7	2	11	10	2
Colombia	102	43	2788	43	8	4	5	2	11	10	2
Chile	0	30	285	30	4	12	1	1	7	4	1
Ecuador	30	24	552	24	4	4	3	1	6	5	1
Venezuela	14	24	157	24	7	1	1	1	8	6	1
Bolivia	8	22	655	22	5	6	3	0	3	4	1
Guatemala	31	13	625	13	2	2	3	1	1	3	1
El Salvador	0	10	307	10	1	2	2	0	3	2	0
Nicaragua	28	10	623	10	3	1	1	1	1	2	1
Dominican Republic	4	9	262	9	1	2	2	1	1	2	1
Honduras	24	9	600	9	1	1	2	1	1	2	0
Panama	34	9	256	9	3	1	1	1	0	2	1
Costa Rica	23	7	50	7	1	1	2	1	1	0	1
Uruguay	14	7	923	7	0	5	0	0	1	0	0
Jamaica	0	5	335	5	0	1	1	1	0	2	0
Paraguay	0	5	49	5	1	2	1	0	0	1	0
Belize	4	4	14	4	1	0	0	1	0	2	0
Guyana	4	3	32	3	1	0	0	0	0	1	0
Grenada	0	1	28	1	0	0	0	0	0	0	0
Saint Vincent and the Grenadines	1	1	9	1	0	0	0	0	0	0	0
Trinidad and Tobago	0	1	35	1	1	0	0	0	0	0	0
Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0
Bahamas	0	3	0	0	0	0	0	0	0	0	0
Barbados	0	0	15	0	0	0	0	0	0	0	0
Dominica	0	0	3	0	0	0	0	0	0	0	0
Haiti	0	7	0	0	0	0	0	0	0	0	0
St. Kitts and Nevis	0	0	33	0	0	0	0	0	0	0	0
St. Lucia	1	0	24	0	0	0	0	0	0	0	0
Suriname	0	0	0	0	0	0	0	0	0	0	0

MIDDLE EAST, NORTH AFRICA	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
Iran (Islamic Republic of)	90	140	432	140	18	33	28	1	35	21	5
Egypt, Arab Republic of	119	138	804	138	6	56	35	2	16	18	4
Yemen, Republic of	142	50	848	50	1	10	13	1	14	10	2
Morocco	36	43	826	43	2	6	11	1	13	8	2
Algeria	74	34	503	34	2	9	8	1	8	4	1
Tunisia	44	15	1058	15	1	3	4	0	4	2	1
Jordan	31	13	677	13	1	3	2	0	4	3	0
Lebanon	13	0	360	0	0	0	0	0	0	0	0
Libyan Arab Jamahiriya	0	0	0	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0	0	0
Oman	0	9	0	0	0	0	0	0	0	0	0
Syrian Arab Republic	0	0	0	0	0	0	0	0	0	0	0

SOUTH ASIA	Actual Env Lending	Optimal Env Lending	Total Bank Lending 98-03	Environment Lending Opportunity	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other
India	1175	1405	11265	1405	59	482	259	15	376	173	42
Bangladesh	215	345	2994	345	4	32	9	1	246	44	9
Pakistan	102	299	2719	299	10	103	49	0	91	38	8
Sri Lanka	58	37	547	37	2	5	3	1	18	6	1
Nepal	37	27	319	27	5	4	8	1	1	7	1
Bhutan	5	3	36	3	0	0	1	0	1	0	0
Maldives	0	3	18	3	0	0	0	1	0	1	0
Afghanistan	0	0	315	0	0	0	0	0	0	0	0

APPENDIX 2
Actual vs. Optimal Lending and AAA

Table II.1: Lending ($US '000,000)

(a) Actual Lending								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	115	269	128	50	138	179	103	981
EAP	341	1,123	476	77	962	416	84	3,479
ECA	160	388	365	19	335	250	34	1,552
LCR	72	269	243	26	186	256	45	1,097
MNA	0	153	42	0	261	83	8	547
SAR	212	654	117	67	235	237	70	1,592
Total	900	2,856	1,371	238	2,117	1,420	344	9,248
(b) Optimal Lending								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	68	350	210	28	157	178	36	1,027
EAP	420	1,358	603	146	831	654	168	4,180
ECA	136	212	56	6	132	98	25	665
LCR	165	189	73	30	168	155	38	817
MNA	32	123	100	8	96	66	15	441
SAR	80	625	328	21	733	270	62	2,118
Total	900	2,856	1,371	238	2,117	1,420	344	9,248
(c) Actual Lending => Optimal Lending by Theme Changes as % of Actual Thematic Totals (Absolute Values)								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	5	3	6	9	1	0	19	0
EAP	9	8	9	29	6	17	24	8
ECA	3	6	23	6	10	11	3	10
LCR	10	3	12	2	1	7	2	3
MNA	4	1	4	3	8	1	2	1
SAR	15	1	15	19	24	2	2	6
Total	45	22	70	68	49	38	53	28

Table II.2: AAA (US $'000)

(a) Actual AAA								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	57	116	315	501	830	155	566	2,540
EAP	85	146	68	203	561	1,522	610	3,196
ECA	201	484	94	202	131	609	593	2,314
LCR	16	46	291	70	150	263	355	1,191
MNA	18	118	15	41	314	119	205	831
SAR	115	230	8	46	159	361	30	949
Total	492	1,141	791	1,063	2,146	3,028	2,359	11,020
(b) Optimal AAA								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	81	417	250	33	187	213	43	1,224
EAP	500	1,618	719	174	990	779	200	4,981
ECA	162	252	67	7	158	116	30	792
LCR	196	225	87	36	200	184	45	974
MNA	38	146	120	10	115	79	18	526
SAR	95	745	391	25	873	321	73	2,524
Total	1,073	3,404	1,634	284	2,523	1,693	410	11,020
(c) Actual AAA => Optimal AAA by Theme Changes as % of Actual Thematic Totals (Absolute Values)								
Region	Climate	Pollution	Land	Biodiversity	Water	Env Pol & Inst	Other	Total
AFR	5	26	8	44	30	2	22	137
EAP	84	129	82	3	20	25	17	360
ECA	8	20	3	18	1	16	24	91
LCR	37	16	26	3	2	3	13	99
MNA	4	2	13	3	9	1	8	41
SAR	4	45	48	2	33	1	2	136
Total	142	239	181	73	96	48	86	866

APPENDIX 3
Comparative Indicators of Country Environmental Problems

In Section 2, we introduce an overall environmental problem indicator that combines indices for five themes: global emissions, pollution, natural resource degradation, biodiversity threats, and water-related problems. To assure equal weighting in the overall indicator, we normalize each thematic index to the range [0-100] and compute the average value of the five indices. Our indicator is specifically tailored for this exercise, because each thematic index matches a category in the World Bank's budget tracking system. However, we recognize that indexing overall environmental problems need not be confined to equal-weighted aggregation of the five thematic indices. In this appendix, we assess the generality of our approach by comparing our overall indicator with others that are based on different aggregation strategies.

We begin by noting significant differences in the units of measurement for our thematic sub-indices. Three are based on DALY-equivalent losses (air pollution, water pollution, flood damage); two on polluting emissions (CO_2 from fossil fuel combustion and forest clearing); two on population pressure (populations occupying fragile lands and water-scarce areas); and two on threatened areas (terrestrial and marine biodiversity). In principle, we would prefer to aggregate across such indicators in common units. For example, our country indicators could tally total health or economic damage, if we had plausible factors for estimating the DALY- or economic-loss-equivalents of global emissions, population pressure on resources, and territorial biodiversity threats. Unfortunately, no broadly-accepted conversion factors exist, and valuation schemes based on human health or economic implications are particularly controversial in the biodiversity policy community.

We seek the middle ground by aggregating the thematic sub-indices into four categories that have common measurement units: DALY losses from pollution and water damage; population pressure on resources; global emissions; and threatened areas that have significance for biodiversity. To produce the four new indices, we add the sub-indices described in the previous paragraph, with one exception. Using GIS, we have computed the population occupying critical areas for terrestrial biodiversity. We treat this as another measure of population pressure on resources, and add it to our estimates for populations occupying fragile lands and water-scarce areas.[12] Since we have no reasonable way of computing equivalent populations for marine biodiversity, we retain its territorial index (% of worldwide reefs at risk).

We use two versions of the four-component index for comparison with our original five-theme index. First, we normalize each category (DALY losses, population pressure, global emissions, marine biodiversity) to the range [0-100] and compute the unweighted average. Second, we develop an index that gives heavy weight (.80) to DALY losses,

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[12] This approach double- (or triple-) counts populations when they occupy overlapping areas for fragile lands, water scarcity, and terrestrial biodiversity. We believe that multiple-counting provides an appropriate indicator for pressure on diverse resources in this context.

and relatively small weights to population pressure (.10), global emissions (.05) and marine biodiversity (.05). Without claiming any precise validity for the implicit conversion factors, we offer this index as a crude approximation of present and discounted future impacts on human health. In any case, it provides a useful comparator with the unweighted average index.

Table A3.1 reports correlations for logs and ranks of the three overall indicators.[13] We refer to the original (5-theme) and alternative (4-aggregate) indicators as Index 1 and Index 2, respectively. The results indicate that the choice of indicator makes little difference in practice: Both correlations between Index 1 and versions of Index 2 are .95 or higher, and the correlation of the Index 2 versions is .93. As Figure A3.1 shows, the high correlations among versions of Indices 1 and 2 reflect an extremely close relationship.

Table A3.1: Correlations Among General Environmental Indicators

Rank Correlations (150 observations)

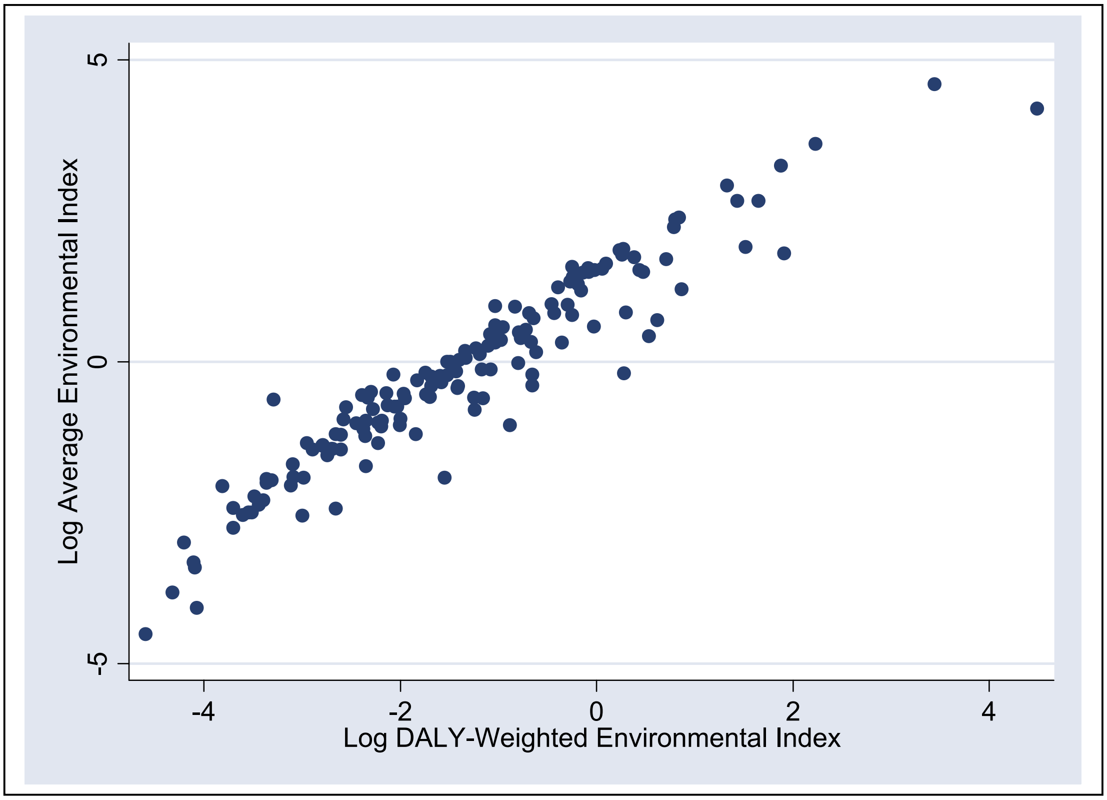
	Index 2 (.80 DALY wgt)	Index 2 (Equal Weights)	Index 1
Index 2 (.80 DALY Wgt)	1.0000		
Index 2 (Equal Wgts)	0.9262	1.0000	
Index 1	0.9525	0.9584	1.0000

Log Correlations (150 Observations)

	Index 2 (.80 DALY wgt)	Index 2 (Equal Weights)	Index 1
Index 2 (.80 DALY Wgt)	1.0000		
Index 2 (Equal Wgts)	0.9314	1.0000	
Index 1	0.9518	0.9665	1.0000

[13] Again, we use logs and ranks to compensate for large scaling differences across countries.

Figure A3.1: Index 1 vs. (.80) DALY-weighted Index 2



Since the aggregation strategies for the two indices are so different, there is nothing automatic about these correlations. To show why the relationships are close, Table A3.2 displays rank and log correlations for the components of Indices 1 and 2. Associated overall indices are identified in parentheses. For population pressure, the table includes both the aggregated component (land, water, terrestrial biodiversity) and separate components for the two parts (land,water / terrestrial biodiversity).

Correlations in the first five rows of the tables are all very high, and they are also high in the next two rows. Only in the final row (for marine biodiversity) do low correlations appear. These results explain why the general indicators are so highly correlated. They would remain so unless marine biodiversity were given an extremely large weight in the overall index.

Table A3.2: Correlations Among Components of Environmental Indicators

Rank Correlations

	Pollution(1)	Land(1)	Water(1)	DALYs(2)	Pop.(2) Pressure	Land(2) Water Pressure	Terr(2) Biod. Pressure	CO2(1,2)	Marine(2) Biodiversity
Land(1)	0.8923								
Water(1)	0.8715	0.8667							
DALYs(2)	0.8773	0.8551	0.8757						
Pop. Pr (2)	0.9217	0.9491	0.9211	0.8489					
Land,Wat Pr(2)	0.9223	0.9501	0.9608	0.8596	0.9706				
Terr Bio Pr(2)	0.7632	0.8000	0.7078	0.6838	0.8776	0.7689			
CO2 (1,2)	0.6930	0.6268	0.6738	0.5311	0.7455	0.7129	0.6614		
Marine Bio(2)	0.0522	0.1009	0.0750	0.0895	0.1186	0.0663	0.1954	0.0207	1.0000

Log Correlations

	Pollution(1)	Land(1)	Water(1)	DALYs(2)	Pop.(2) Pressure	Land(2) Water Pressure	Terr(2) Biod. Pressure	CO2(1,2)	Marine(2) Biodiversity
Land(1)	0.9098								
Water(1)	0.8784	0.8741							
DALYs(2)	0.8539	0.8325	0.8773						
Pop. Pr (2)	0.9316	0.9553	0.9163	0.8298					
Land,Wat Pr(2)	0.9350	0.9618	0.9528	0.8413	0.9735				
Terr Bio Pr(2)	0.7715	0.7912	0.7037	0.6690	0.8721	0.7663			
CO2 (1,2)	0.7415	0.6956	0.7034	0.5613	0.7812	0.7623	0.6681		
Marine Bio(2)	-0.0382	-0.0045	0.0169	0.0852	0.0303	-0.0279	0.1478	-0.0311	1.0000

In this appendix, we have compared three different indicators for overall environmental problems in the World Bank's partner countries. One indicator is the unweighted average of indicators that match the Bank's thematic budget categories for environmental lending. The other two indicators are built from four components that reflect natural aggregation opportunities in the thematic subindices. We create different indicators with alternative weighting schemes for these four components: An unweighted average, and an index that gives disproportionate weight to measurable health damage. Despite the differences in aggregation strategy and component weighting, we find that the three general indices have extremely high correlations. These reflect very high correlations among index subcomponents, with the exception of the index for marine biodiversity.

APPENDIX 4

Country Environmental Indices

Region	Country	Country Code	Total Annual CO2 Emissions (2000)	Total Pollution DALYs	Population on Fragile Lands (WDR 2002)	Average Share of Biodiversity Population and Reefs at Risk	Water Problem Index	Overall Environmental Index	Problem Index for Environmental Institutions
AFR	Angola	AGO	0.9068	1.8514	1.4199	0.8278	0.1958	1.1143	1.9500
AFR	Benin	BEN	0.8920	0.3945	0.5567	0.3068	0.2539	0.5150	0.6437
AFR	Botswana	BWA	0.7224	0.0185	0.1825	0.0071	0.2664	0.2564	0.2564
AFR	Burkina Faso	BFA	0.4535	0.7447	2.1476	0.0000	0.8654	0.9021	1.3531
AFR	Burundi	BDI	0.2137	0.2183	0.5033	0.6762	0.3087	0.4113	0.7199
AFR	Cameroon	CMR	2.1230	1.3418	1.5295	1.6632	0.1375	1.4556	2.1834
AFR	Cape Verde	CPV	0.0043	0.0110	0.0000	0.0388	0.0031	0.0123	0.0123
AFR	Central African Republic	CAF	0.4247	0.2511	0.3215	0.4100	0.1166	0.3264	0.4897
AFR	Chad	TCD	0.4466	1.0883	0.9410	0.5262	0.4398	0.7373	1.8433
AFR	Comoros	COM	0.0083	0.0069	0.0756	0.7913	0.0459	0.1988	0.4970
AFR	Congo	COG	0.3025	0.6956	0.1684	0.1518	0.0965	0.3031	0.4546
AFR	Cote d'Ivoire	CIV	2.1893	1.1276	1.3575	1.5727	0.3082	1.4042	1.7553
AFR	Democratic Republic of the Congo	ZAR	7.5195	4.9162	7.5629	5.0101	0.9769	5.5664	8.3497
AFR	Djibouti	DJI	0.0363	0.0000	0.0282	0.7986	0.0423	0.1940	0.3394
AFR	Equatorial Guinea	GNQ	0.1162	0.0290	0.0544	0.0443	0.0000	0.0523	0.0914
AFR	Eritrea	ERI	0.0127	0.3721	0.9283	4.1296	0.5175	1.2768	1.2768
AFR	Ethiopia	ETH	1.4590	7.3725	6.9108	6.9811	3.7517	5.6713	8.5069
AFR	Gabon	GAB	0.2191	0.0493	0.0292	0.1151	0.0003	0.0885	0.1327
AFR	Gambia	GMB	0.0240	0.1224	0.1142	0.0565	0.0785	0.0848	0.1271
AFR	Ghana	GHA	0.9877	0.8018	1.3314	1.9180	0.8172	1.2544	1.5680
AFR	Guinea	GIN	0.4055	0.7477	1.0270	0.4917	0.0510	0.5833	0.7291
AFR	Guinea Bissau	GNB	0.0632	0.1484	0.0769	0.0000	0.0489	0.0723	0.1265
AFR	Kenya	KEN	1.3463	1.8902	3.2676	4.1531	1.2682	2.5546	4.4705
AFR	Lesotho	LSO	0.0605	0.0766	0.2942	0.1442	0.0332	0.1304	0.2282
AFR	Liberia	LBR	0.8500	0.1399	0.2548	0.3804	0.0026	0.3487	0.6625
AFR	Madagascar	MDG	1.8954	1.1642	1.0728	5.2894	0.2856	2.0795	3.6390

Region	Country	Country Code	Total Annual CO2 Emissions (2000)	Total Pollution DALYs	Population on Fragile Lands (WDR 2002)	Average Share of Biodiversity Population and Reefs at Risk	Water Problem Index	Overall Environmental Index	Problem Index for Environmental Institutions
AFR	Malawi	MWI	0.6796	0.6796	0.4505	1.3086	0.7475	0.8281	1.2422
AFR	Mali	MLI	0.6978	0.8424	1.6741	0.1123	0.6123	0.8438	1.4766
AFR	Mauritania	MRT	0.2840	0.4620	0.2732	0.0159	0.3767	0.3024	0.4536
AFR	Mauritius	MUS	0.0797	0.0000	0.0000	1.3827	0.0046	0.3142	0.2357
AFR	Mozambique	MOZ	0.5052	1.2749	1.0236	4.7177	0.9549	1.8157	2.7236
AFR	Namibia	NAM	0.2630	0.0698	0.2839	0.0324	0.1855	0.1788	0.2235
AFR	Niger	NER	0.2723	0.9681	2.3924	0.0020	1.4984	1.0996	1.9243
AFR	Nigeria	NGA	7.2621	12.9246	12.5207	6.6690	2.7742	9.0292	13.5438
AFR	Rwanda	RWA	0.2318	0.6294	0.9714	0.7958	0.3054	0.6285	0.9427
AFR	Sao Tome and Principe	STP	0.0021	0.0077	0.0063	0.0181	0.0000	0.0073	0.0128
AFR	Senegal	SEN	0.4571	0.9345	1.1514	0.0289	0.7917	0.7205	0.9007
AFR	Seychelles	SYC	0.0054	0.0005	0.0000	0.5063	0.0002	0.1098	0.1098
AFR	Sierra Leone	SLE	0.3546	0.5836	0.6986	0.6277	0.0004	0.4852	0.8490
AFR	Somalia	SOM	0.0000	0.3958	1.8966	1.4769	1.3678	1.1004	1.9532
AFR	South Africa	ZAF	8.4329	1.1370	4.6014	2.8963	4.1524	4.5456	4.5456
AFR	Sudan	SDN	2.6443	2.1251	4.6193	2.4044	3.8820	3.3578	5.8762
AFR	Swaziland	SWZ	0.0189	0.0272	0.1566	0.0758	0.0210	0.0642	0.1123
AFR	Tanzania	TZA	1.5453	2.2307	3.0535	10.1379	1.9286	4.0478	7.0836
AFR	Togo	TGO	0.2978	0.3053	0.4052	0.3384	0.2281	0.3373	0.5060
AFR	Uganda	UGA	1.3430	1.4216	3.1087	1.3658	1.1344	1.7937	2.2421
AFR	Zambia	ZMB	5.1635	1.0184	0.5727	1.1385	0.2946	1.7539	2.1924
AFR	Zimbabwe	ZWE	1.6509	0.6603	1.7932	1.2610	0.6551	1.2897	1.9345
EAP	Cambodia	KHM	2.5360	0.8494	0.8239	1.5824	0.3849	1.3231	2.3155
EAP	China	CHN	100.0000	100.0000	100.0000	66.8254	100.0000	100.0000	100.0000
EAP	Federated States of Micronesia	FSM	0.0000	0.0000	0.0000	4.2897	0.0000	0.9189	1.3784
EAP	Fiji	FJI	0.0587	0.0362	0.0139	12.0801	0.0437	2.6204	3.2754
EAP	Indonesia	IDN	62.1512	11.4187	14.7599	100.0000	6.4973	41.7345	62.6017

Region	Country	Country Code	Total Annual CO2 Emissions (2000)	Total Pollution DALYs	Population on Fragile Lands (WDR 2002)	Average Share of Biodiversity Population and Reefs at Risk	Water Problem Index	Overall Environmental Index	Problem Index for Environmental Institutions
EAP	Kiribati	KIR	0.0011	0.0040	0.0000	2.4953	0.0000	0.5356	0.9374
EAP	Korea, Republic of	KOR	10.7061	2.8399	1.3485	0.0000	4.5143	4.1576	3.1182
EAP	Lao People's Democratic Republic	LAO	0.6154	0.1158	0.6993	0.6880	0.1124	0.4779	0.8363
EAP	Malaysia	MYS	17.6222	0.3122	1.4990	8.2787	0.1521	5.9689	5.9689
EAP	Marshall Islands	MHL	0.0000	0.0000	0.0000	0.3447	0.0000	0.0738	0.1107
EAP	Mongolia	MNG	0.5697	0.1340	0.0968	0.1994	0.2555	0.2689	0.4034
EAP	Myanmar	MMR	10.3228	2.7633	2.6054	7.6709	0.7731	5.1701	7.7552
EAP	Palau	PLW	0.0050	0.0000	0.0000	0.0012	0.0000	0.0013	0.0000
EAP	Papua New Guinea	PNG	3.1437	0.2698	0.7470	11.8367	0.1317	3.4550	6.0463
EAP	Philippines	PHL	4.5896	2.7102	1.6094	52.0147	3.1286	13.7208	20.5813
EAP	Samoa	WSM	0.0035	0.0001	0.0000	0.8342	0.0033	0.1802	0.1802
EAP	Solomon Islands	SLB	0.0120	0.0157	0.0515	4.6634	0.0225	1.0207	2.0414
EAP	Thailand	THA	6.2804	2.2475	2.3871	11.1330	2.3248	5.2210	5.2210
EAP	Tonga	TON	0.0053	0.0000	0.0000	1.2154	0.0000	0.2615	0.3922
EAP	Vanuatu	VUT	0.0182	0.0027	0.0268	5.0536	0.0000	1.0927	1.6391
EAP	Vietnam	VNM	1.6227	4.0098	5.8763	11.4812	2.0257	5.3587	8.0380
ECA	Albania	ALB	0.0905	0.0509	0.2400	0.2847	0.1110	0.1665	0.2497
ECA	Armenia	ARM	0.1365	0.5736	0.2579	0.4220	0.3758	0.3783	0.5674
ECA	Azerbaijan	AZE	0.8608	0.6782	0.6247	0.9665	0.6502	0.8098	1.2147
ECA	Belarus	BLR	1.9358	0.0000	0.0472	0.0000	0.4688	0.5252	0.6565
ECA	Bosnia-Herzegovina	BIH	0.3419	0.1305	0.2452	0.0677	0.0116	0.1707	0.2561
ECA	Bulgaria	BGR	1.4503	1.2728	0.1400	0.2785	0.5259	0.7856	0.5892
ECA	Croatia	HRV	0.5351	0.0878	0.1596	0.0679	0.1014	0.2039	0.2039
ECA	Cyprus	CYP	0.1639	0.0638	0.0925	0.0964	0.0518	0.1003	0.1103
ECA	Czech Republic	CZE	2.9150	0.1034	0.0537	0.0935	0.3513	0.7534	0.3767
ECA	Estonia	EST	0.4045	0.0242	0.0751	0.0000	0.0344	0.1153	0.0865

Region	Country	Country Code	Total Annual CO2 Emissions (2000)	Total Pollution DALYs	Population on Fragile Lands (WDR 2002)	Average Share of Biodiversity Population and Reefs at Risk	Water Problem Index	Overall Environmental Index	Problem Index for Environmental Institutions
ECA	FYR Macedonia	MKD	0.2276	0.0496	0.0911	0.2205	0.0894	0.1453	0.1816
ECA	Georgia	GEO	0.2398	0.9365	0.2670	0.5919	0.0816	0.4534	0.6801
ECA	Hungary	HUN	1.6407	0.2670	0.2091	0.0069	0.5181	0.5659	0.2830
ECA	Kazakhstan	KAZ	3.2324	0.4406	1.2302	0.3149	1.2614	1.3880	1.7350
ECA	Kyrgyz Republic	KGZ	0.1452	0.1392	0.6936	0.2807	0.6423	0.4072	0.6109
ECA	Latvia	LVA	0.2910	0.0671	0.0368	0.0000	0.0563	0.0967	0.0725
ECA	Lithuania	LTU	0.4928	0.1825	0.0894	0.0000	0.0972	0.1846	0.1385
ECA	Poland	POL	7.5946	2.0360	0.1092	0.5814	1.6791	2.5706	1.2853
ECA	Republic of Moldova	MDA	0.2211	0.1435	0.2303	0.0000	0.4788	0.2300	0.2875
ECA	Romania	ROM	2.7288	0.5918	0.5117	0.4035	1.3796	1.2029	1.2029
ECA	Russian Federation	RUS	39.8270	5.7603	2.9763	3.0478	6.3715	12.4207	15.5258
ECA	Slovakia	SVK	0.9672	0.0344	0.1945	0.1072	0.1349	0.3081	0.2311
ECA	Slovenia	SVN	0.4249	0.0218	0.1060	0.0345	0.0000	0.1258	0.0629
ECA	Tajikistan	TJK	0.1675	0.1899	0.8516	0.7056	0.6120	0.5412	1.0825
ECA	Turkey	TUR	7.7901	6.2446	2.7470	3.0529	3.0016	4.8918	6.1148
ECA	Turkmenistan	TKM	1.2652	0.2611	0.6502	0.4896	0.4865	0.6753	1.1818
ECA	Ukraine	UKR	10.6160	3.6682	0.8563	0.0425	3.0862	3.9135	4.8918
ECA	Uzbekistan	UZB	3.6756	1.3102	2.4277	2.3394	2.4903	2.6226	3.9340
ECA	Yugoslavia	YUG	1.2384	0.2049	0.4120	0.2925	0.2855	0.5213	0.7819
LCR	Antigua and Barbuda	ATG	0.0274	0.0004	0.0004	0.4371	0.0000	0.0996	0.0000
LCR	Argentina	ARG	7.0101	4.5965	0.3398	0.5715	3.1743	3.3615	4.2018
LCR	Bahamas	BHS	0.0401	0.0125	0.0051	2.7194	0.0005	0.5950	0.8925
LCR	Barbados	BRB	0.0315	0.0008	0.0000	0.1812	0.0002	0.0458	0.0641
LCR	Belize	BLZ	0.4600	0.0051	0.0216	1.5018	0.0025	0.4265	0.5331
LCR	Bolivia	BOL	2.4935	0.6013	0.6610	0.8849	0.4741	1.0956	1.3695
LCR	Brazil	BRA	44.9867	3.8868	3.8518	19.2876	6.2602	16.7671	20.9589
LCR	Chile	CHL	1.8772	1.1070	0.2862	1.8161	0.9696	1.2973	1.2973

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LCR	Colombia	COL	5.4294	0.5506	1.5978	5.1924	2.2811	3.2242	4.8363
LCR	Costa Rica	CRI	0.4533	0.0802	0.3384	2.0355	0.1114	0.6467	0.0000
LCR	Dominica	DMA	0.0034	0.0005	0.0010	0.0934	0.0000	0.0211	0.0316
LCR	Dominican Republic	DOM	0.6126	0.2578	0.4910	1.9107	0.2374	0.7518	0.9397
LCR	Ecuador	ECU	2.0063	0.3728	0.7706	1.5540	0.9557	1.2123	1.8184
LCR	El Salvador	SLV	0.3301	0.1988	0.3583	0.7571	0.5057	0.4606	0.6908
LCR	Grenada	GRD	0.0026	0.0012	0.0084	0.2704	0.0000	0.0605	0.0908
LCR	Guatemala	GTM	1.5875	0.2555	1.0514	1.5572	0.1615	0.9882	1.4823
LCR	Guyana	GUY	0.7880	0.0118	0.0822	0.0713	0.0085	0.2060	0.3605
LCR	Haiti	HTI	0.1912	0.5034	0.7006	1.5807	0.3001	0.7017	1.7544
LCR	Honduras	HND	0.6312	0.1479	0.4842	1.5713	0.2343	0.6574	0.9861
LCR	Jamaica	JAM	0.3172	0.1018	0.2038	2.4849	0.0349	0.6732	0.8415
LCR	Mexico	MEX	12.3518	4.8426	4.8053	10.4601	8.7519	8.8281	8.8281
LCR	Nicaragua	NIC	1.3549	0.1403	0.2280	1.3006	0.2074	0.6922	0.8652
LCR	Panama	PAN	1.2038	0.0860	0.1807	1.1689	0.0131	0.5682	0.7103
LCR	Paraguay	PRY	0.9507	0.2586	0.2160	0.2506	0.1082	0.3822	0.6689
LCR	Peru	PER	5.2245	1.5320	1.6687	3.2369	1.6835	2.8588	3.5735
LCR	Saint Vincent and the Grenadines	VCT	0.0050	0.0013	0.0106	0.2462	0.0001	0.0564	0.0846
LCR	St. Kitts and Nevis	KNA	0.0021	0.0002	0.0002	0.3209	0.0000	0.0693	0.1039
LCR	St. Lucia	LCA	0.0116	0.0033	0.0067	0.3094	0.0000	0.0709	0.0887
LCR	Suriname	SUR	0.0707	0.0164	0.0205	0.0130	0.0000	0.0258	0.0000
LCR	Trinidad and Tobago	TTO	0.4366	0.0081	0.0726	0.1075	0.0002	0.1339	0.1339
LCR	Uruguay	URY	0.0224	0.4543	0.0082	0.0325	0.1165	0.1358	0.1358
LCR	Venezuela	VEN	7.8181	0.2699	0.4344	2.4978	2.6000	2.9176	4.3764
MNA	Algeria	DZA	2.3372	1.6133	3.1651	3.0606	2.2880	2.6700	2.6700
MNA	Egypt, Arab Republic of	EGY	3.6780	6.5512	9.5115	5.1725	2.9807	5.9752	7.4690
MNA	Iran (Islamic Republic of)	IRN	9.0828	3.1907	6.2713	2.5593	5.2583	5.6472	7.0589

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MNA	Jordan	JOR	0.4834	0.2803	0.3473	0.4996	0.5860	0.4706	0.8235
MNA	Lebanon	LBN	0.3801	0.1799	0.0906	0.4008	0.0000	0.2252	0.3942
MNA	Libyan Arab Jamahiriya	LBY	1.1208	0.1070	0.1502	0.4916	0.2596	0.4561	0.0000
MNA	Malta	MLT	0.0476	0.0000	0.0098	0.0381	0.0000	0.0204	0.0000
MNA	Morocco	MAR	1.2510	0.8229	3.4791	3.1124	2.5847	2.4099	3.6149
MNA	Oman	OMN	0.6048	0.2689	0.0895	0.7350	0.2182	0.4105	0.4721
MNA	Syrian Arab Republic	SYR	1.4361	1.1805	1.9036	0.9732	1.6082	1.5212	0.0000
MNA	Tunisia	TUN	0.6931	0.3040	0.9238	0.9416	0.6833	0.7595	0.5697
MNA	Yemen, Republic of	YEM	0.5088	1.1904	3.7265	2.9417	2.6924	2.3692	4.1460
SAR	Afghanistan	AFG	0.6179	3.3626	4.2685	0.3472	1.3241	2.1251	5.3127
SAR	Bangladesh	BGD	2.2978	3.4078	2.2230	2.8736	41.3357	11.1686	16.7529
SAR	Bhutan	BTN	0.0360	0.0362	0.1719	0.2311	0.0823	0.1194	0.1194
SAR	India	IND	36.8703	56.9200	71.2473	35.1628	69.0581	57.6787	72.0983
SAR	Maldives	MDV	0.0138	0.0085	0.0000	1.7602	0.0000	0.3818	0.3818
SAR	Nepal	NPL	3.1384	0.5089	2.1001	2.8099	0.2050	1.8770	2.8155
SAR	Pakistan	PAK	6.4731	12.0533	13.3931	0.2538	16.6377	10.4559	15.6839
SAR	Sri Lanka	LKA	1.1579	0.5941	0.9722	3.3988	3.2730	2.0127	2.5159